**Gilmarite**

\[ \text{Cu}_3(\text{AsO}_4)(\text{OH})_3 \]

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**Crystal Data:** Triclinic. **Point Group:** 1. Lozenge-shaped crystals, elongated along [101] or [100], flattened on {010}, also showing {100}, {101}, {001}, to 0.1 mm; typically in rosettes.

**Physical Properties:** *Cleavage:* Good on {010}. *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = \(\sim 3\)  D(meas.) = 4.2(1)  D(calc.) = 4.21

**Optical Properties:** Transparent. *Color:* Blue-green. *Streak:* Blue-green. *Luster:* Vitreous. *Optical Class:* Biaxial (–). *Pleochroism:* Weak; \(X = Y = \) light green; \(Z = \) green. *Orientation:* On {010}, \(X \wedge c = 33^\circ\) and \(Y \wedge a = 37.1^\circ\); on {001}, \(Y \wedge a = 34.3^\circ\) and \(Z \wedge b = 30.1^\circ\); on {101}, \(Z \wedge b = 44^\circ\) and \(Y' \wedge [101] = 36.5^\circ\). *Dispersion:* \(r > v\), weak. \(\alpha = 1.760(5)\)  \(\beta = 1.80(1)\)  \(\gamma = 1.83(1)\)  \(2V(\text{meas.}) = 77(4)^\circ\)  \(2V(\text{calc.}) = 80(1)^\circ\)

**Cell Data:** *Space Group:* \(P\overline{1}\).  \(a = 5.445(4)\)  \(b = 5.873(3)\)  \(c = 5.104(3)\)  \(\alpha = 114.95(3)^\circ\)  \(\beta = 93.05(5)^\circ\)  \(\gamma = 91.92(4)^\circ\)  \(Z = 1\)

**X-ray Powder Pattern:** Roua mines, France. 4.613 (100), 3.390 (60), 4.580 (50), 2.713 (40), 2.543 (40), 2.445 (30), 3.654 (20)

**Chemistry:**

<table>
<thead>
<tr>
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<th>(1)</th>
<th>(2)</th>
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<tbody>
<tr>
<td>(\text{As}_2\text{O}_5)</td>
<td>29.64</td>
<td>30.20</td>
</tr>
<tr>
<td>(\text{CuO})</td>
<td>63.0</td>
<td>62.70</td>
</tr>
<tr>
<td>(\text{H}_2\text{O})</td>
<td>[7.36]</td>
<td>7.10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>[100.00]</td>
<td>100.00</td>
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(1) Roua mines, France; by electron microprobe, average of five analyses, \(\text{H}_2\text{O}\) by difference; corresponds to \(\text{Cu}_{3.08}(\text{As}_{0.98}\text{O}_4)/(\text{OH})_{3.10}\). (2) \(\text{Cu}_3(\text{AsO}_4)(\text{OH})_3\).

**Polymorphism & Series:** Dimorphous with clinoclase.

**Occurrence:** A rare secondary mineral associated with other copper arsenates and copper arsenides in the oxidized zone.

**Association:** Cuprite, posnjakite, langite, clinotyrolite, connellite, brochantite, malachite, vësigniëte, cornubite, olivenite, trippkeite, domeykite, djurleite.

**Distribution:** From the Roua copper mines, about 50 km north of Nice, Alpes Maritimes, France.

**Name:** To honor Gilbert Mari (1944– ), mineralogist, University of Nice-Sophia Antipolis, Nice, France, who collected the samples in which the mineral was found.

**Type Material:** Natural History Musem, Geneva, Switzerland, 477.006.